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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,189	10/03/2003	Luc Van Autryve	008764	9509

44257 7590 03/16/2005

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EXAMINER	
LEE, HSIEN MING	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/679,189	**Applicant(s)** AUTRYVE ET AL.	
	Examiner Hsien-ming Lee	**Art Unit** 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-35 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,6-14,16-18,28-31 and 33-35 is/are rejected.

7)☒ Claim(s) 5,10,15,19-27,31 and 32 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE
PRIMARY EXAMINER
3/10/05

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/~~Mail Date~~ 062904, 040904, 012204
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

2. Claims 19, 23 and 31 are objected to because of the following informalities: the phrase "about 0.84 or greater" renders indefinite because "or greater" lacks an upper limit and is a relative term. The term "or greater" is not defined by the claim and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 4, 6-8, 28, 31 and 33-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Sohn (US 6,475,888).

In re claim 1, Sohn teaches depositing a layer 59 comprising amorphous carbon on a substrate 50 (Fig.5D), wherein the layer 59 is used as a laser absorber layer, and then laser annealing the substrate 50 comprising the amorphous carbon 59 thereon (col. 5, lines 33-46).

In re claim 28, Sohn teaches a substrate 50, processed by a method comprising: depositing a layer 59 comprising amorphous carbon on the substrate 50 (Fig.5D) and then laser annealing the substrate 50 comprising the amorphous carbon 59 thereon (col. 5, lines 33-46).

In re claim 4, Sohn teaches removing the layer 59 after the laser annealing (from Fig.5D to Fig.5E).

In re claims 6 and 33, Sohn teaches implanting ions into the substrate 50 before depositing the layer of amorphous carbon 59 (Fig.5C and col. 5, lines 25-30).

In re claims 7 and 34, Sohn teaches forming a gate source area 56a and a gate drain area 56b in the substrate 50 before implanting (Fig.5C).

In re claims 8 and 35, Sohn teaches that the substrate is laser annealed for a period of time sufficient to activate the implanted dopant ions (col. 5, lines 42-45).

In re claim 31, Sohn inherently teaches the claimed limitation since similar process can reasonably be expected to yield product which inherently have the same properties. *In re* Spada 15 USPQ2d 1655 (CAFC 1990); *In re* DeBlauwe 222 USPQ 191; *In re* Wiegand 86 USPQ 155 (CCPA 1950).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 9, 28 and 29 are rejected under 35 U.S.C. 102(a) as being anticipated by KR 375093 B, published on March 8, 2003).

In re claims 28 and 29, KR 375093 teaches a substrate (i.e. a desired layer), processed by a method comprising: depositing a layer comprising amorphous carbon on the substrate and annealing the substrate by laser, wherein the layer of amorphous carbon comprises fluorine (i.e. fluorinated amorphous carbon).

In re claim 9, KR 375093 teaches a method of processing a substrate (i.e. a desired layer), comprising: depositing a layer comprising amorphous carbon on the substrate and annealing the substrate by laser, wherein the layer of amorphous carbon comprises fluorine (i.e. fluorinated amorphous carbon).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn (US '888) in view of Bailey et al.(US 5,569,501).

In re claim 2, Sohn does not teach that the amorphous carbon is deposited by plasma enhanced chemical vapor deposition (PECVD).

Bailey et al. teach using PCECVD for depositing amorphous carbon layer (i.e. diamond-like film),wherein the amorphous carbon layer would have the advantage of thermally stable (col. 3, lines 15-27).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to utilize PECVD , as taught by Bailey et al., for depositing the amorphous carbon of Sohn, since by this manner it would produce a thermally stable amorphous carbon.

In re claim 3, Bailey et al. also remedy the deficiency in Sohn because Bailey et al teach any hydrocarbon compound, including propylene (i.e. C_3H_6), in PECVD (col. 4, line 63 through col. 5, line 1 and 21-24) for depositing the amorphous carbon.

9. Claims 9, 14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn (US '888) in view of KR 375093 B.

In re claim 9, Sohn teaches depositing a layer 59 comprising amorphous carbon on a substrate 50 (Fig.5D) and then laser annealing the substrate 50 comprising the amorphous carbon 59 thereon (col. 5, lines 33-46).

Sohn does not teach that the layer of amorphous carbon 59 comprising a dopant of fluorine.

KR 375093, however, teaches a method of processing a substrate (i.e. a desired layer), comprising: depositing a layer comprising amorphous carbon on the substrate and annealing the substrate by laser, wherein the layer of amorphous carbon comprises fluorine (i.e. fluorinated amorphous carbon).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to include fluorine, as taught by KR 375093, in the layer of amorphous carbon of Sohn, since by this manner it would provide a thermally stable amorphous carbon.

In re claim 14, Sohn also teaches removing the layer 59 after the laser annealing (from Fig.5D to Fig.5E).

In re claim 16, Sohn teaches implanting ions into the substrate 50 before depositing the layer of amorphous carbon 59 (Fig.5C and col. 5, lines 25-30).

In re claim 17, Sohn teaches forming a gate source area 56a and a gate drain area 56b in the substrate 50 before implanting (Fig.5C).

In re claim 18, Sohn teaches that the substrate is laser annealed for a period of time sufficient to activate the implanted dopant ions (col. 5, lines 42-45).

10. Claims 9-11, 12, 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US 6,559,017) in view of Sohn (US '888).

In re claims 9, 10, 28 and 30, Brown et al. teach depositing a layer 200 comprising amorphous carbon on a substrate 120 (Fig.3), wherein the layer 200 comprises nitrogen (col. 4, lines 1-3) and then rapid thermally annealing the substrate 20 to activate dopant in the substrate 120 (col. 4, lines 7-8). Brown et al. do not teach that the rapid thermally annealing is a laser annealing.

Sohn, however, teaches using a laser for annealing the amorphous carbon.

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to utilize laser , as taught by Sohn, for annealing the amorphous carbon of Brown et al., since laser annealing an art recognized equivalence to rapid thermal annealing.

In re claim 11, the selection of the temperature is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious). One of the ordinary skill in the art would have been motivated to select a desired temperature with a consideration of the source gases (e.g. nitrogen and C_3H_6) for depositing the amorphous carbon, i.e. depositing temperature is material dependent. In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. See M.P.E.P. 2144.05, III

In re claim 12, Brown et al. also teach that the layer of amorphous carbon 200 is deposited by PECVD (col. 4, lines 1-2).

11. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US '017) in view of Sohn (US '888) and further in view of Bailey et al.(US 5,569,501).

Brown et al. in view of Sohn teach depositing the layer of amorphous carbon layer 200 comprises nitrogen (col. 4,lines 1-3, Brown et al.), wherein nitrogen is necessity for depositing the layer of amorphous carbon.

Brown et al. in view of Sohn do not teach combining C_3H_6 (i.e. propylene) with nitrogen in depositing the layer of amorphous carbon.

Bailey et al., however, teach any hydrocarbon compound, including propylene (i.e. C_3H_6), in PECVD (col. 4, line 63 through col. 5, line 1 and 21-24) for depositing the amorphous carbon.

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to combine propylene (i.e. C_3H_6), as taught by Bailey et al, in forming the amorphous carbon layer of Brown et al. in view of Sohn, since by this manner it would form a satisfactory amorphous carbon comprising nitrogen.

Allowable Subject Matter

12. Claims 5, 15 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claim 19 would be allowable if rewritten or amended to overcome the objection, set forth in this Office action.

14. Claims 20-27 are objected to as being dependent upon an objected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither teaches nor suggest that the laser annealing comprising focusing continuous wave electromagnetic radiation into a line extending across a surface of the substrate; and .

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (8:00 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hsien-ming Lee
Primary Examiner
Art Unit 2823

March 10, 2005

HSIEN-MING LEE
PRIMARY EXAMINER
3/10/2005